

Application No. 09/848,140

REMARKS

Prior to entry of this Amendment, claims 1-7 were pending. By this Amendment, claims 1 and 7 are amended, claims 23-34 are added, and no claims are canceled. After entry of this Amendment, claims 1-7 and 23-34 will be pending.

Claims 1 and 7 have been amended as to form, to make even more apparent the features of the claimed base plate. No new matter has been added and no narrowing amendments are intended.

New Claims

New claim 23 is directed to a metal-ceramic circuit board. New claims 24-28, 33, and 34 depend from claim 23. New claims 29 and 30 depend from claim 1, and new claims 31 and 32 depend from claim 7. Support for new claims 23-34 can be found throughout the present application as filed, for example at page 7, lines 9-18; page 8, lines 8-11; page 9, line 13 – page 16, line 12; page 19, line 23 – page 23, line 8; and in FIGS. 1-4. Therefore, no new matter has been added.

Claim Rejections – 35 U.S.C. § 103

Claims 1, 2, and 4-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,531,044 to Chang (hereinafter “Chang”) in view of U.S. Patent No. 4,284, 437 to Baba et al. (hereinafter “Baba”) and further in view of U.S. Patent No. 5,650,662 to Edwards et al. (hereinafter “Edwards”). Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang, Baba, and Edwards, and further in view of U.S. Patent No. 6,033,787 to Nagase et al. (hereinafter “Nagase”). These rejections are respectfully traversed.

Application No. 09/848,140

Applicants respectfully submit that a *prima facie* case of obviousness has not been established with respect to the combination of Chang, Baba, and Edwards suggested in the Office Action. There is no motivation to combine the cited references as suggested, and there is no reasonable expectation of success in such a combination. Further, even if combined as suggested, the cited references would not teach or suggest each and every limitation of the claims.

There is no teaching or suggestion to combine Baba with either Chang or Edwards. Baba is directed to a process for preparing hard tempered aluminum alloy sheet. The process of Baba includes hot rolling an ingot of aluminum alloy, intermediate annealing the hot rolled alloy, and final cold rolling the annealed alloy (Abstract). Baba includes no mention of laser soldering, ceramic substrates, or electrical leads as taught by Chang, but rather teaches use of the sheets for preparing "deeply drawn cups" (Baba, col. 5, lines 43-49; see also col. 1, lines 12-16, discussing the suitability of alloys "for cans for beverages, food and other goods"). Applicants respectfully submit that one skilled in the art of circuit boards would not be motivated to look to Baba, and no such motivation can be found in any of Baba, Chang, or Edwards.

Further, there is no reasonable expectation of success in the suggested combination of Baba, Chang, and Edwards. As previously mentioned, Baba teaches a process that includes hot rolling an ingot of aluminum alloy, intermediate annealing the hot rolled alloy, and final cold rolling the annealed alloy (Abstract). Such a process would be incompatible with a ceramic substrate and the teachings of Chang and Edwards. The alloy sheet of Baba could not be directly bonded to either the ceramic substrate board of Chang or the substrate of Edwards if preformed, and the alloy sheet of Baba could not be formed if the alloy was directly bonded to a ceramic prior to hot rolling, annealing, and cold rolling, as the ceramic is brittle and would crack or break under the pressures of Baba's process. There is no teaching or suggestion in any of Baba, Chang, or Edwards to provide an expectation of success to the contrary.

Application No. 09/848,140

Even if combined as suggested, the cited references fail to teach each and every limitation of the claims. Claim 1 recites "a base plate of aluminum or aluminum alloy, the base plate having a proof stress not higher than 320 (MPa) and a thickness not smaller than 1 mm," in combination with the other elements recited in the claim. None of Chang, Baba, and Edwards, teach or suggest such a base plate.

The Office Action states that "Chang does not disclose the aluminum alloy base plate having a proof stress not higher than 320 MPa." Office Action, page 3, lines 1-2. Therefore, Chang does not teach or suggest the base plate recited in claim 1.

Baba does not even mention a base plate. Further, the sheets taught by Baba have thicknesses smaller than 1 mm. See col. 5, lines 5-12, wherein sheets A₁, B₁, and C₁ summarized in TABLE 2 (col. 6) have thicknesses 0.32 mm. Sheets D₁, D₂, and E₁ of TABLE 4 are 0.4 mm thick (col. 6, lines 28, 34, and 44, respectively). Sheets F₁, F₂, G₁, and G₂ of TABLE 6 are also each 0.4 mm thick (col. 7, line 15). Therefore, Baba does not teach or suggest a base plate at all, much less a base plate having a proof stress not higher than 320 (MPa) and a thickness not smaller than 1 mm, as required by claim 1.

Edwards does not include any mention of proof stress not higher than 320 (MPa) or a thickness not smaller than 1mm. Therefore, Edwards also does not teach or suggest the base plate recited in claim 1. Although not cited with respect to claim 1, Nagase also does not include any teaching or suggestion of a base plate as recited in claim 1, having both a proof stress not higher than 320 (MPa) and a thickness not smaller than 1mm.

Applicants respectfully submit that claim 1 is therefore allowable. Claims 2-6, 29, and 30 depend from claim 1 and are therefore also allowable. The rejections of claims 2-6 are traversed but not expressly argued herein in light of the allowability of the underlying base claim.

Application No. 09/848,140

Similar to claim 1, claim 7 recites, in part, "a base plate of aluminum or aluminum alloy, the base plate having a proof stress not higher than 320 (MPa) and a thickness not smaller than 1mm." Although not treated in the rejections, claim 23 also similarly includes the limitation of "a substantially planar base plate of aluminum or aluminum alloy, the base plate having a proof stress of not higher than 320 MPa and a thickness of not smaller than 1mm." Therefore, claims 7 and 23 are also allowable at least for the reasons set forth above with respect to claim 1. Claims 24-28 and 31-34 depend from either claim 7 or claim 23 and are therefore also allowable.

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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